

Information Systems

I-1

INPUT

Fundamental Driving Forces

Key Business Trends:

- Shorter product life cycles
- More customization/specialization
- Narrower market segments
- Higher impact of technology
- More competition from overseas vendors

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Fundamental Driving Forces

- *Apply to the information systems and services industry*
- *Are restructuring the role of IS management*
 - Reactive to proactive
 - Technology-driven to user-driven
 - Centralized to "federated"

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I-3

Blocking Factors

- Infrastructure gridlock
- Lack of qualified in-house personnel
- Existing applications portfolio
- Organizational response time

Create opportunities for the information services industry

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Strategic Values

- Information
- Information systems (IS)
- Information technology (IT)

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Information Systems Major Issues

- Rising management expectations
- Demands for increasingly complex solutions
- Managing the technology investment
- Integration of data/technology/applications
- Delivery of "mission-critical" systems

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Information Systems Driving Forces

1. Bottom line return
2. Rapid response and deployment
3. Expanding wealth of technology
4. International competition
5. Unstable organizational environments
6. Integration

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Where's the Productivity?

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I-8

IS Trends

- IS to reduce costs
- IS for competitive advantage
- Mission-critical systems
- Inter-enterprise systems
- Integrated customer-oriented systems

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IS Issues

- Reporting structure
- Scope of responsibility
- Budgetary authority
- Senior management people expectations

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Make vs. Buy

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Development

- Where performed?
- By whom?

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Telecommunications

- Responsibility?
- Integration?

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Other Issues

- Education and training
- Standards and policies

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Internal IS Considerations

- Who owns the data?
- Who gets benefit from its use?
- Is information an "asset"? Or is it free?

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Information Systems Priorities

- Clear expectations of IS
- Identify mission-critical processes
- Application development—use all alternatives

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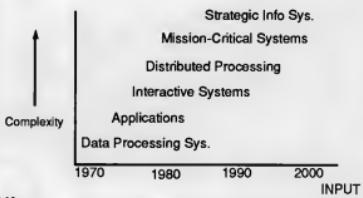
Information Systems Priorities

- Data management—company-wide orientation
- Technology architecture—network management
- Central IS—consulting role

I-17

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Complexity of the Requirement



Breadth of the Relationship



Complexity



Law 1

Rate of supply >
rate of absorption

1-21

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Limits to Growth

- Absorption rate
- Implementation
- Education and training
- Organization changes
- Resistance to change
- Logistics

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Buying Process Changing

- Involves
- Users
- IS management
- Finance
- Corporate management
- More specialists

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Technology is a Mixed Blessing

- Technology adds complexity
- Poor application is counter-productive
- Change process with systems

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Ranking of Key Technology Trends

1. Integrated data bases (relational)
2. Platform independence/systems connectivity
3. CASE technologies
4. Expert systems
5. On-line transaction processing

I-25

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Ranking of Impact of New Technologies

1. Image processing
2. Voice recognition
3. Natural language processing
4. Self-teaching expert systems

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Technology Trends

- Not a driving force
- Evolutionary vs. revolutionary
- Three phases of technology application
 - Comparative advantage
 - Comparative parity
 - Comparative necessity

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Without Change There is No Benefit from IS

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The Human Element

- Changing systems is a process
- Evolution not revolution

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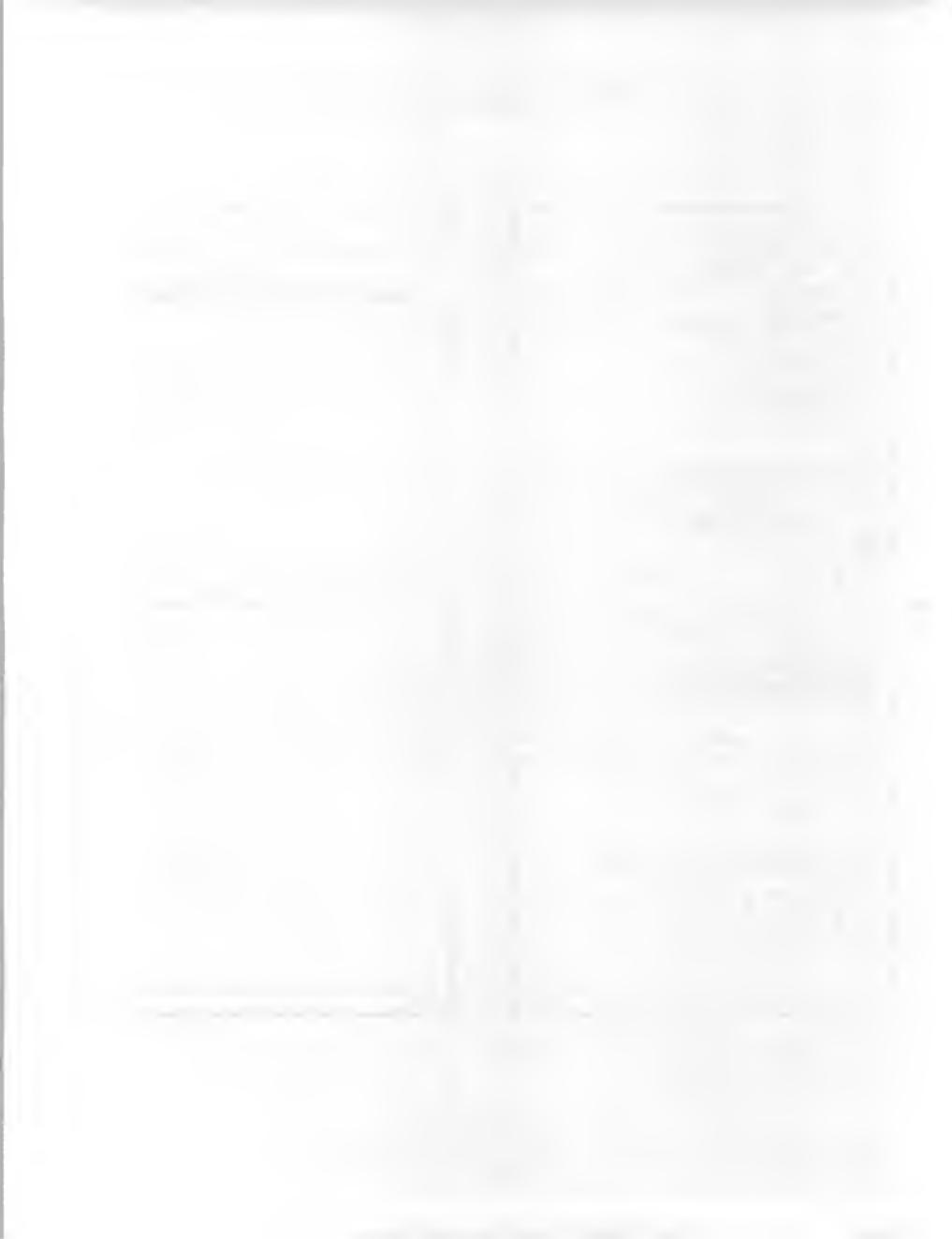
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Concerns

• Ergonomics	• Organization
• Health	• Redundancy
• Deskilling	• Progress

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CIM—The Human Element

- U.S.
 - Technology as a fix
- Japan
 - Technology plus people

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Corporate Organization

- IT and IS will change the organization
- How will it operate?
- People
 - How many?
 - When?
 - What skills?

I-32

INPUT

V.P. Humatics

I-33

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Key Future Trends—Impact on IS

Trend	Impact on IS
Business integration—within companies	Centralization of infrastructure planning
Business integration—between companies	
Decentralization of technology	

I-34

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Key Future Trends—Impact on IS

Trend	Impact on IS
Increasing use of communications	Network view of the corporation
Emphasis on business planning	Decreased involvement in operations

I-35

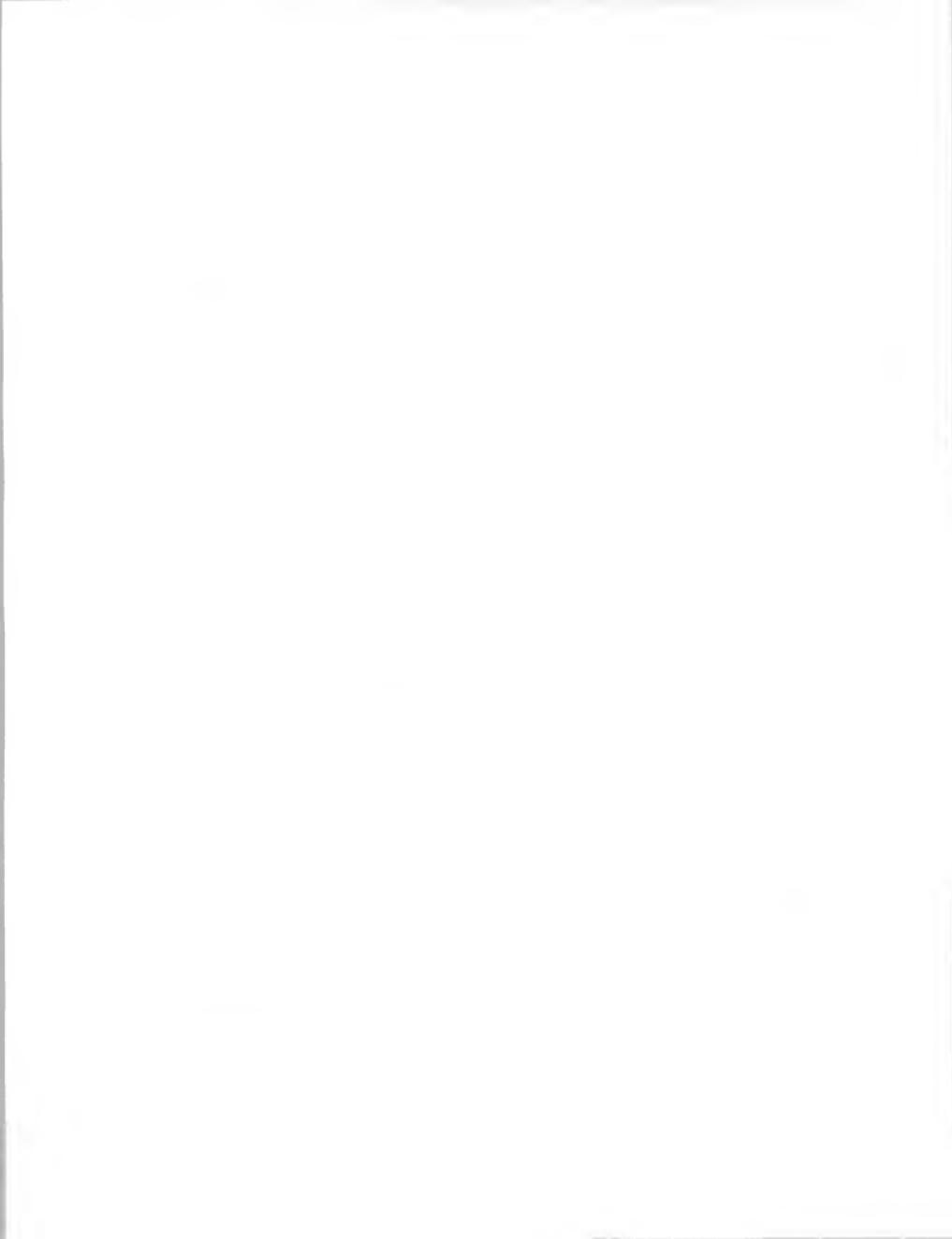
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Industry Structure Model

- Information-oriented
- Service-oriented
- Product-oriented

I-36

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Information-Oriented

- Heavy involvement in enterprise planning
- Strong technology strategy
- Mixed systems development roles
- Strong core operations

I-37

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Service-Oriented

- Varied involvement in enterprise planning
- Mixed technology strategy
- Centralized systems development roles
- Strong core operations

I-38

INPUT

Product-Oriented

- Varied involvement in enterprise planning
- Varied technology strategy
- Varied systems development roles
- Varied core operations

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Evolution of CIO Role

- Role will not disappear
- Same objectives/problems
- More focus on strategy/planning
- Less focus on systems development/operations
- Stronger focus on telecom/network

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Information Systems Executive Role in the 1990s



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IS Organization in the 1990s

Not Centralized

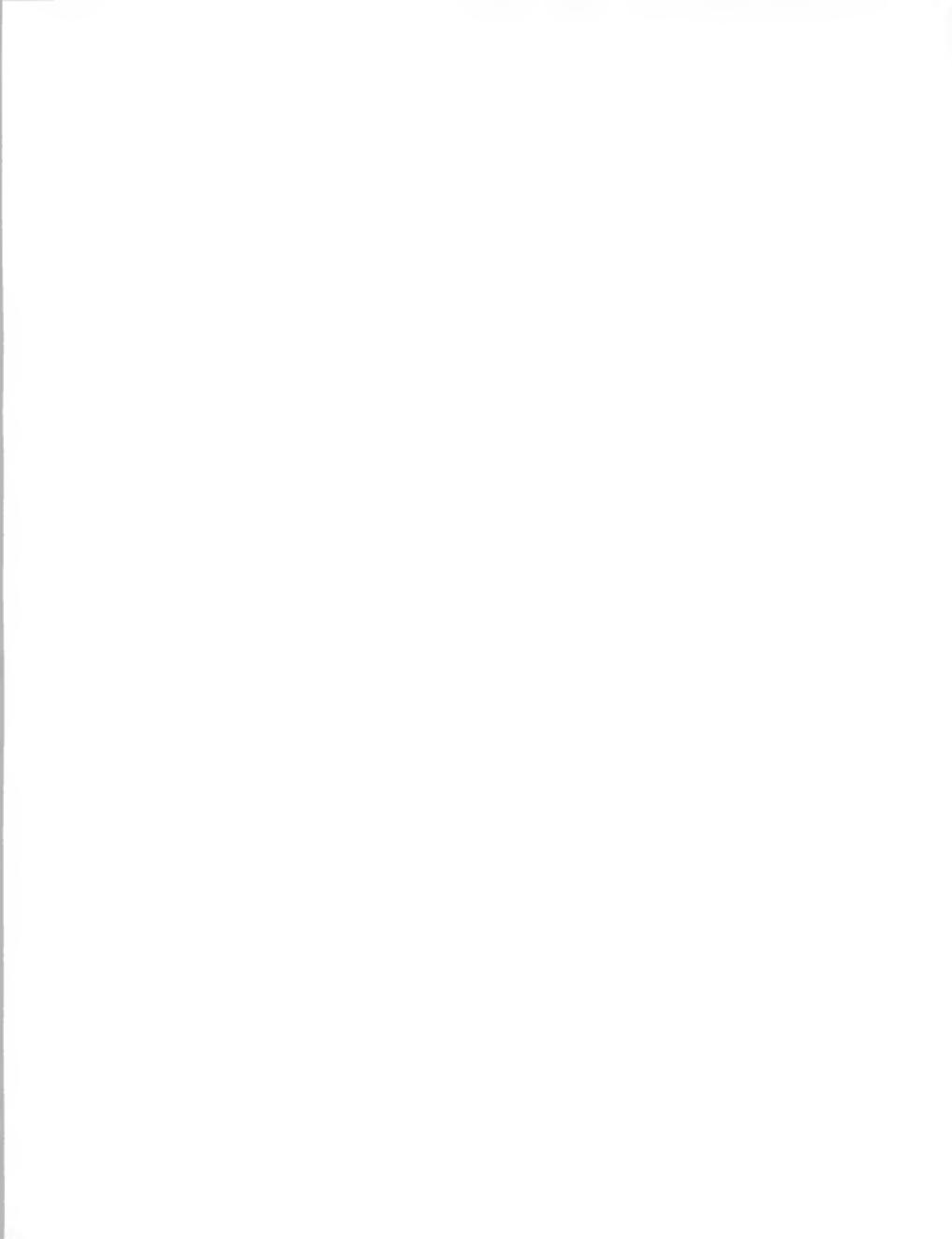
Not Decentralized

Federated

Brought together "by agreement of each party to sublimate its power to the central authority in common affairs." - Webster

I-42

INPUT



Federated IS Organization

Federal Government	Corporate IS
Defense	Competition
Treaties	Partnerships
Regulation	Standards
National programs	Corporate systems
I-43 National policies	Corporate policies
	INPUT

Federated IS Organization

State Government	Unit IS
Citizens	Customers
Local issues	Business support
Operating programs	Operating systems
Policy implementation	Policy implementation
I-44	INPUT

Corporate Information Systems Organization Style

- Smaller
- Expert based—technology and business
- Consulting style—information engineers and solution builders
- Marketeers for technology

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I-45

IS Responsibilities—1990s

- Treat "users" as customers
- Analyze "make" or "buy" decisions
- Consult on strategy and direction

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IS Responsibilities—1990s

- Support organizational units at all levels in use of:
 - Information
 - Information systems and services
 - Information technology

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Communications

- Executives
- Customers (users)
- Staff

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Information Systems Technology Trends

- Integrated data bases (relational)
- Platform independence/systems connectivity
- CASE technologies
- Expert systems
- On-line transaction processing capabilities

I-49

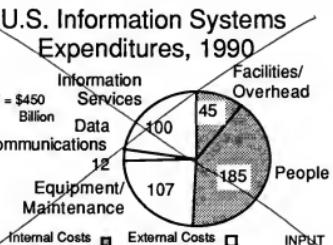
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Impacts

- Looking outside for solutions
- Buying process changing
 - Users
 - IS management
 - Corporate management
 - Finance
 - Partnerships with vendors

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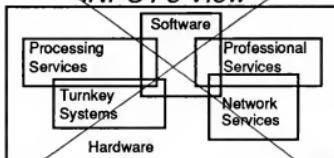
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IS Market Structure—1980s INPUT's View



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Key Trends for the 1990s

- Changing market channels
- Internationalization of offerings
- Standards a growing influence
- Vendor consolidation
- Professional services—"the glue"

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Information Systems Budget Impact of Economic Slowdown

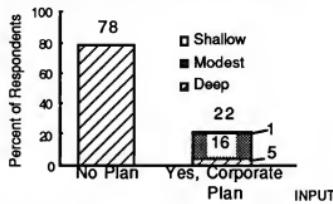
4th Quarter 1990

I-54

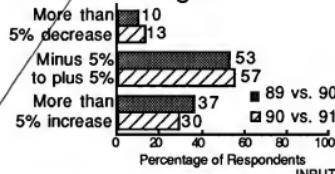
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Planning for a Recession



Information Systems Budgets



Current Spending Restrictions Organization-Wide, 1990

- 54% have restrictions in place now
- Of those with restrictions:
 - 42% closely monitor all expenses
 - 31% limit or have frozen hiring
 - 21% limit or have frozen capital spending

I-57 INPUT

1991 Spending Restrictions Organization-Wide

- 58% plan for restrictions in 1991
 - Only 4% above those with 1990 restrictions

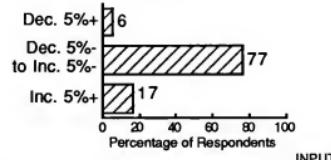
I-58 INPUT

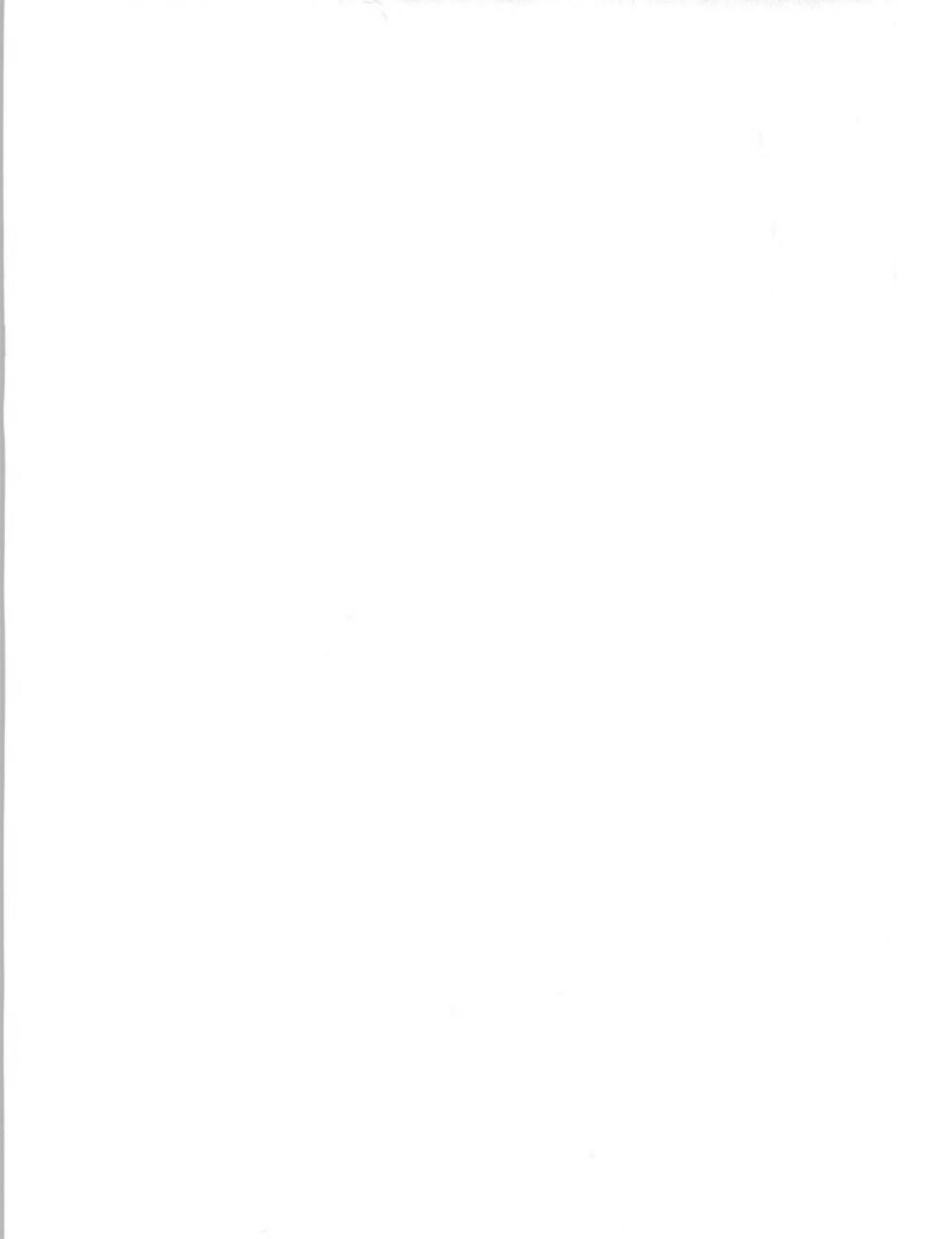
1991 Spending Restrictions Organization-Wide

- For the 4%, plans include:
 - Across-the-board cuts
 - Staff reductions
 - Reducing new development

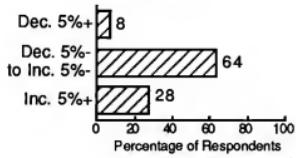
I-59 INPUT

IS Budget, 1990 vs. 1991 Staff



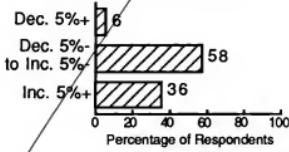


IS Budget, 1990 vs. 1991 Hardware



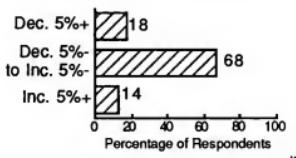
I-41

IS Budget, 1990 vs. 1991 Software Products



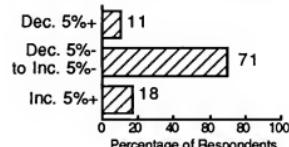
I-42

IS Budget, 1990 vs. 1991 Outside Services



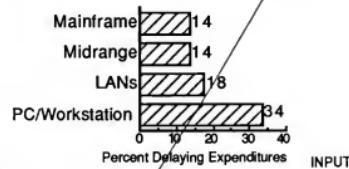
I-43

IS Budget, 1990 vs. 1991 Telecommunications



I-44

1991 Economic Impacts on Hardware Spending



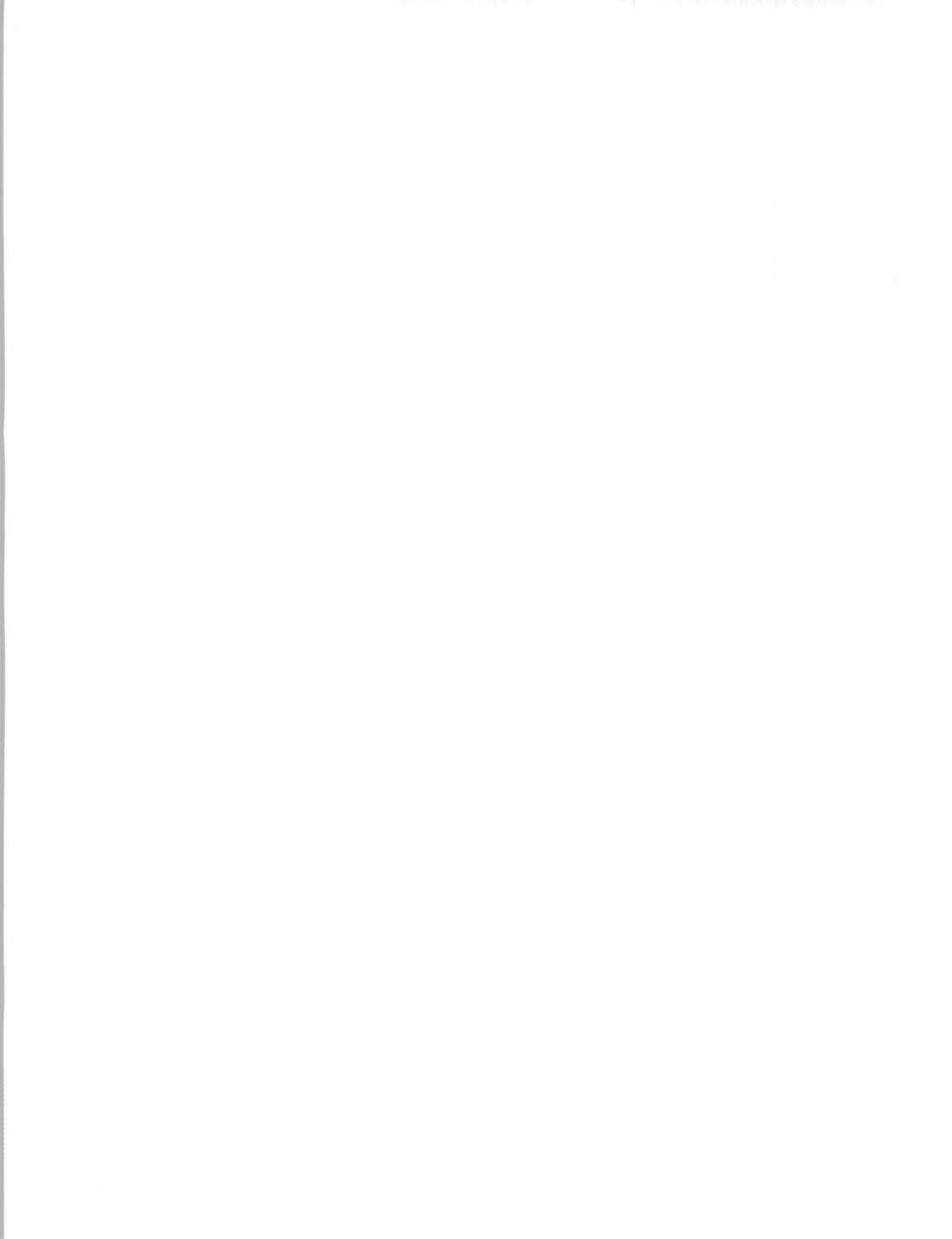
I-45

Systems Downsizing

- 52% implementing downsizing
- 20% planning or considering

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I-45a



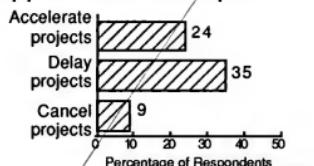
Recessionary Impacts

- Recessionary impacts
 - 53% no impact
 - 39% would increase spending
 - 8% would slow

I-66

INPUT

Recessionary Impacts on Application Development



I-67

Percentage of Respondents INPUT

Recessionary Impacts on Information Services

- Question: "If moderate recession, what impacts?"
- Consulting
 - 42%—Spending down more than 10%
 - 39%—Spending unchanged

I-68

INPUT

Recessionary Impacts on Information Services

- Systems Development
 - 41%—Spending down more than 10%
 - 27%—Spending unchanged

I-69

INPUT

Recessionary Impacts on Information Services

- Processing Services
 - 59%—Spending unchanged
 - 33%—Increase spending more than 10%

I-70

INPUT

Recessionary Impacts on Information Services

- Systems Integration
 - 29%—Spending down more than 10%
 - 47%—Spending unchanged

I-71

INPUT



Recessionary Impacts on Information Services

- Systems Operations (Outsourcing)
 - 50%—Spending unchanged
 - 33%—Increase spending more than 10%

I-72

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1991 Spending—Impacts Have Begun

Market Sector	1991 Budget	Recession Spending
Wholesale distribution	n/c	-
Retail distribution	n/c	-
Discrete manufacturing	+	-

+ = Budget/spending up n/c = No change
 - = Budget/spending down

I-73

INPUT

1991 Spending—Impacts Have Begun

Market Sector	1991 Budget	Recession Spending
Process manufacturing	+	-
Federal government	n/c	-

+ = Budget/spending up n/c = No change
 - = Budget/spending down

I-74

INPUT

1991 Spending—Impacts Probable

Market Sector	1991 Budget	Recession Spending
Transportation	+	-
Banking and finance	+	-
State & local government	+	-

+ = Budget/spending up n/c = No change
 - = Budget/spending down

I-75

INPUT

1991 Spending—Minimal Impacts Expected

Market Sector	1991 Budget	Recession Spending
Insurance	+	+
Medical/health care	+	+
Business/consumer svcs.	+	n/c

+ = Budget/spending up n/c = No change
 - = Budget/spending down

I-76

INPUT

1991 Spending—Minimal Impacts Expected

Market Sector	1991 Budget	Recession Spending
Utilities	n/c	n/c
Telecommunications	n/c	n/c
Education	+	n/c

+ = Budget/spending up n/c = No change
 - = Budget/spending down

I-77

INPUT



Delete all

Users: Recession-Related Topics

- Recession vs. current restrictions
- Negotiating and trade-offs
- Speeding vs. slowing development
- Inside vs. outside development
- Inside vs. outside systems operations

I-78

INPUT

Vendors: Recession-Related Topics

- Vendor vs. user spending restrictions
- Implications of user downsizing
- Inside vs. outside development
- Inside vs. outside systems operations
- Sector-by-sector questions

I-79

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Information Technology Implementation Trends

I-80

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Information Technologies Surveyed

- Image processing
- Cooperative processing
- CASE
- Distributed DBMS
- Object-oriented programming

I-82

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Information Technologies Surveyed

- LANS, WANS, MANS
- Open systems
- SAA
- UNIX
- Data center management

I-83

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Technology Implementation IS vs. Business Inhibitors



I-85

INPUT



Technology Implementation Business Mgmt. Inhibitors

Rank	Percent of Respondents	Inhibitors
1	41	Business need
2	19	Business interruption
3	15	Budget
4	10	Cost/benefit
5	9	Startup cost

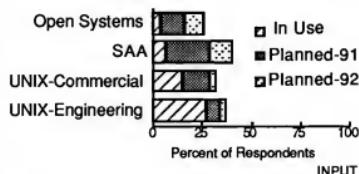
I-86 INPUT

Technology Implementation IS Mgmt. Inhibitors

Rank	Percent of Respondents	Inhibitors
1	22	Staff availability
2	21	Existing systems
3	19	Integration
4	14	Training
5	12	Resistance to change

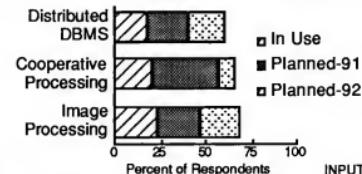
I-87 INPUT

Technology Status and Timing Operating Systems/Architecture



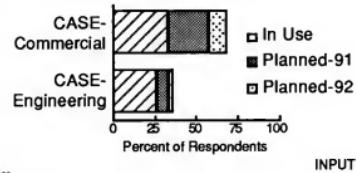
I-88 INPUT

Technology Status and Timing Operating Systems/Architecture



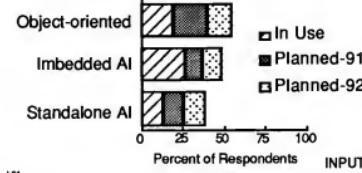
I-89 INPUT

Technology Status and Timing Application Development



I-90 INPUT

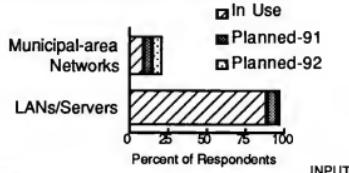
Technology Status and Timing Application Development



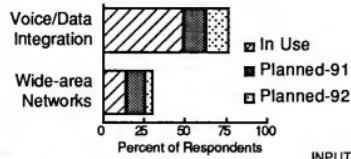
I-91 INPUT



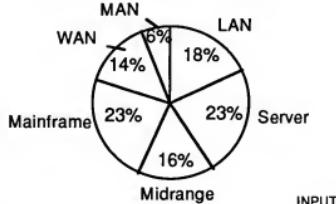
Technology Status and Timing Networks/Communications



Technology Status and Timing Networks/Communications



LAN Interconnections



LAN Use—Active Central Applications

Application	% Act. 1990	% to be Act.—1992
Accounting	45	60
Executive Info Sys	27	65
Mainframe DBS Queries	40	72

I-95 INPUT

LAN Use—Active Central Applications

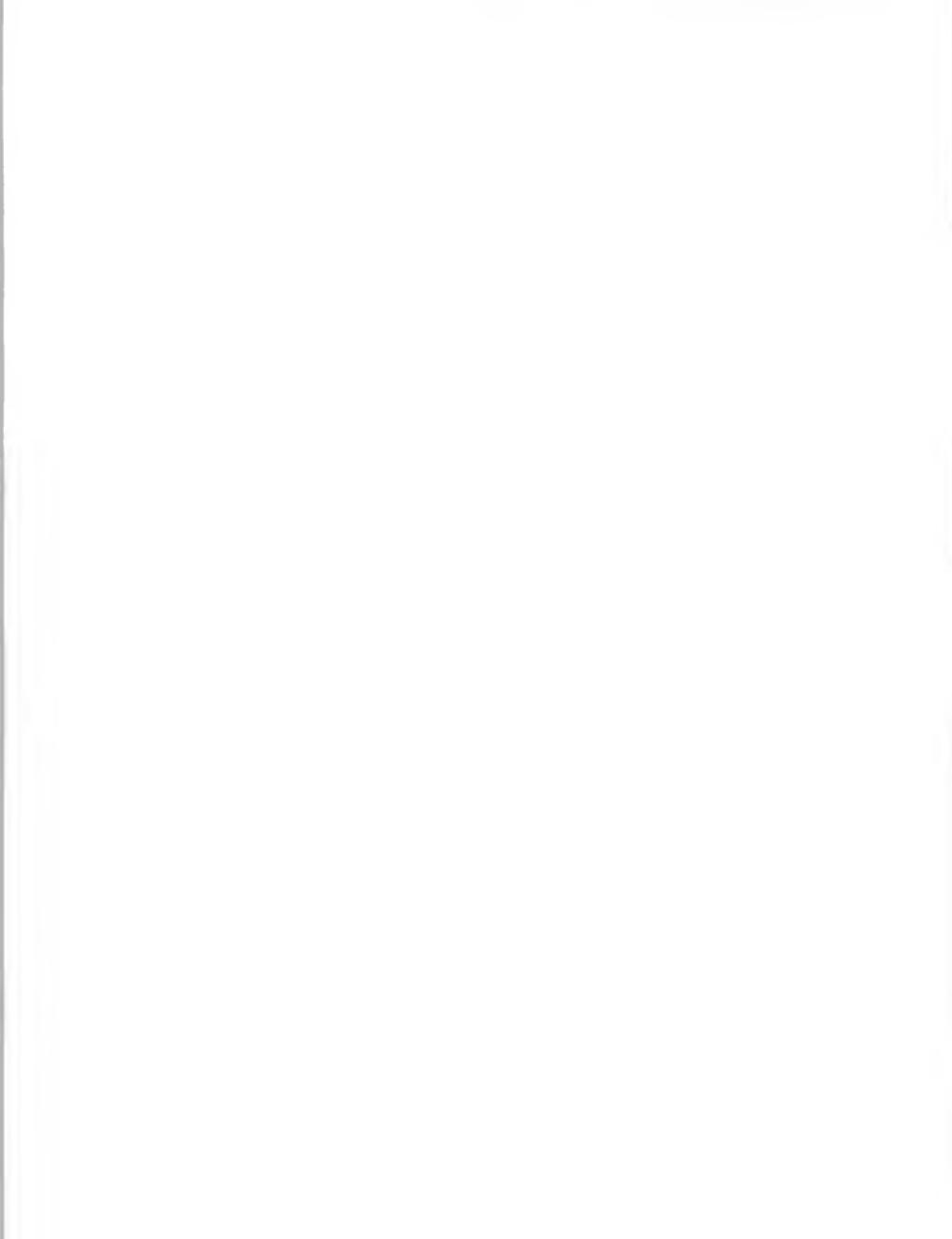
Application	% Act. 1990	% to be Act.—1992
Production Scheduling	16	36
Sales Reporting	23	38
Order Entry	23	37

I-96 INPUT

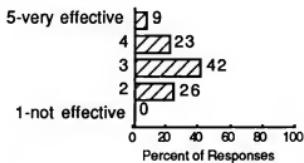
LAN Use—Active PC Applications

Application	% Act. 1990	% to be Act.—1992
Electronic Mail	52	75
Desktop Publishing	55	68
PC Tools	84	90

I-97 INPUT

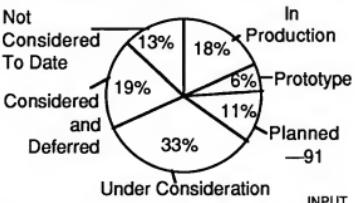


Effectiveness of LAN Interconnections



I-98

Status of Image Processing



I-99

Image Processing in Use by Industry

Industry	In Use (Percent)	Planning (Percent)
Insurance	20	8
Transportation	20	12
Discrete Mfg	15	18
Process Mfg	10	23

I-100

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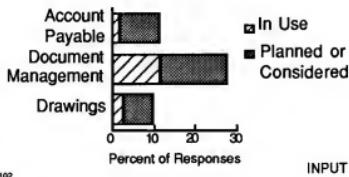
Image Processing in Use by Industry

- Others
 - Education
 - Telecommunications
 - Wholesale Distribution

I-101

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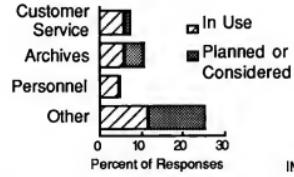
Image Processing Applications



I-102

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Image Processing Applications

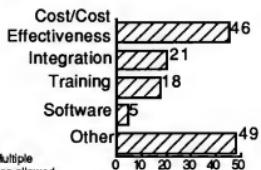


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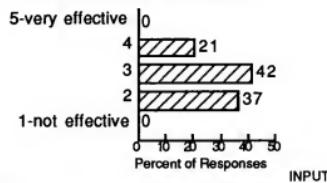


Issues for Image Processing



Note: Multiple responses allowed
I-104

Effectiveness of Image Processing Systems



I-105

Application Development Issues

Issues	Overall Importance
Funding	6
Re-engineering	1
Human resources availability	2
End-user application development	4

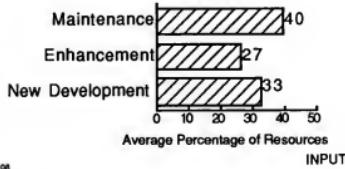
I-106

Application Development Issues

Issues	Overall Importance
Relational DBMS	4
Workstation-based	3
Distributed DBMS	8
CASE	7
Vendor capabilities	9

I-107

Allocation of Development Resources

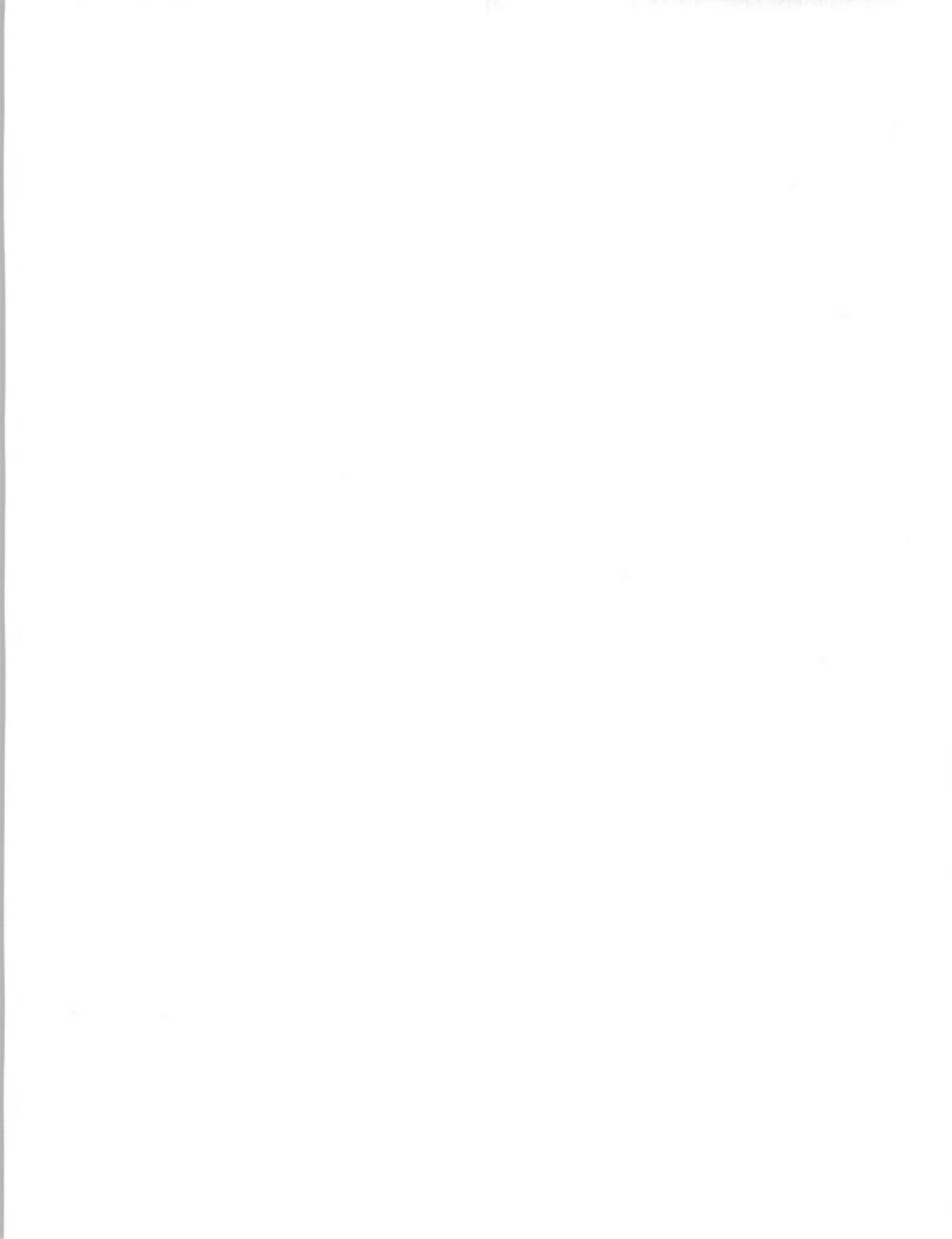


I-108

Controlling Application Maintenance Resources

	% Using
Limited resource allocation	71
Purchased software replacement	43
Re-engineering of applications	38

I-109



Controlling Application Maintenance Resources

	% Using	
Maintenance only function	34	
Contract out	22	
Assign to user	18	
Recode	13	INPUT

I-110

Controlling Application Maintenance Resources

	Effectiveness*	
Re-engineering of applications	3.1	
Maintenance only function	2.8	
Purchase of software replacement	2.7	
		INPUT

I-111

Controlling Application Maintenance Resources

	Effectiveness*	
Recode	2.7	
Limited resource allocation	2.7	
Contract out	2.7	
Assign to user	2.6	
		INPUT

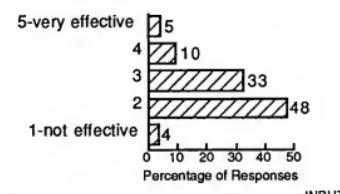
I-112

Issues in Using CASE

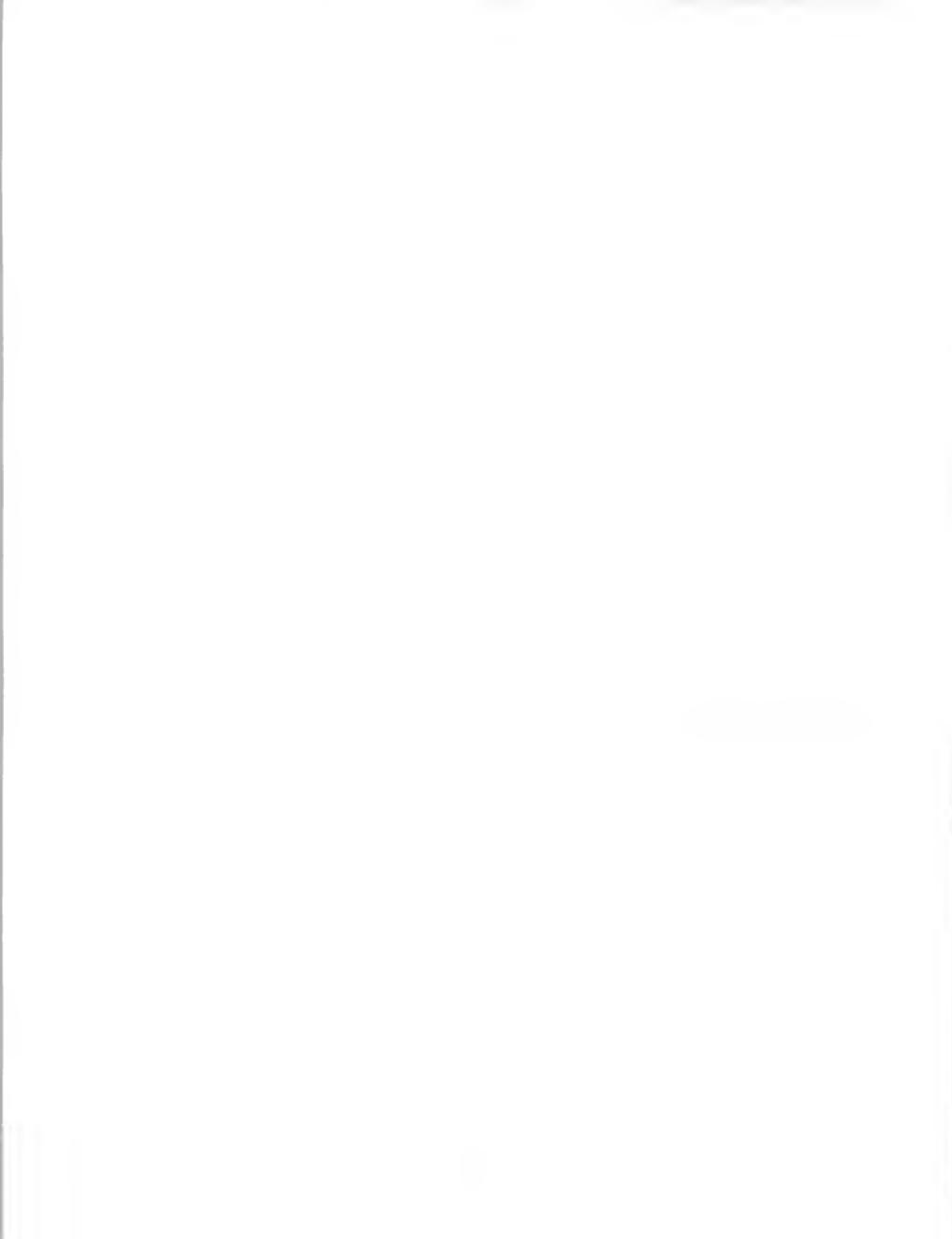
Issue	Using	Considering
Staff acceptance	✓✓✓	✓✓
Cost/training	✓✓✓	✓
Integration	✓✓	✓✓
Planning	✓✓	✓
Proven results	✓	✓
Methodology	✓	✓
		INPUT

I-114

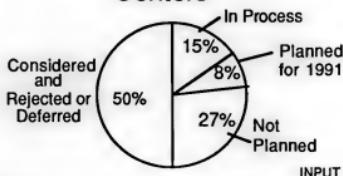
Effectiveness of CASE



I-115

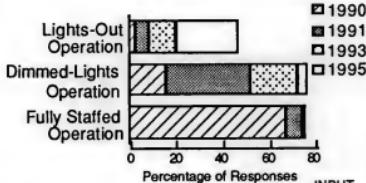


Consolidation of Data Centers



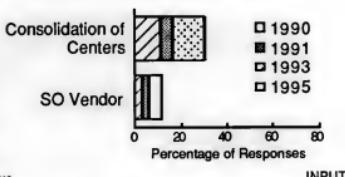
I-116

Data Center Objectives



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Data Center Objectives



I-118

Information Technology Trends Observations

- Inhibitors differ between IS and top management
- Technologies apparent to top management adopted faster
- Learning curves remain—witness image processing and CASE

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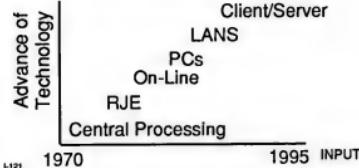
Information Technology Trends Observations

- Data center management area of focus
- Overall effectiveness satisfactory at best

I-120

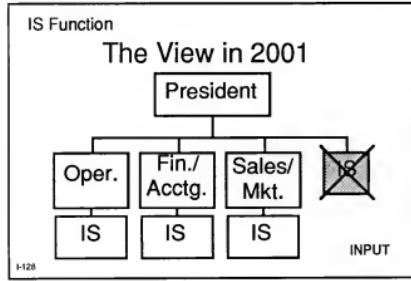
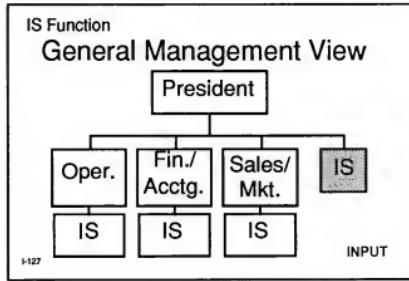
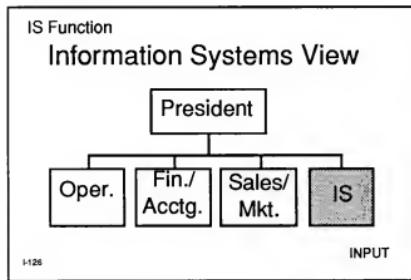
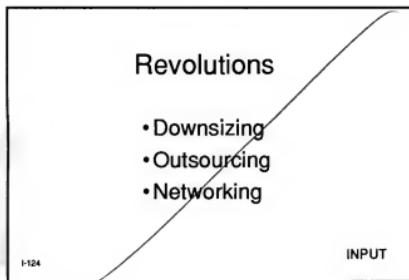
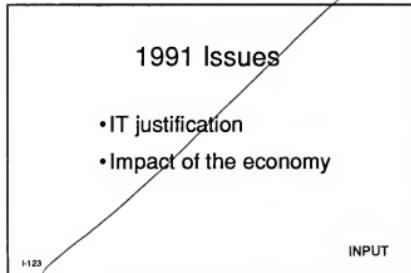
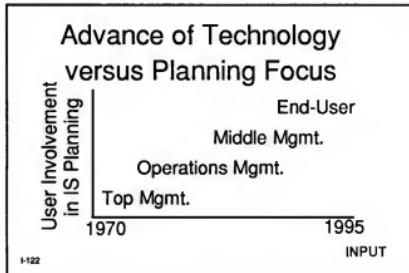
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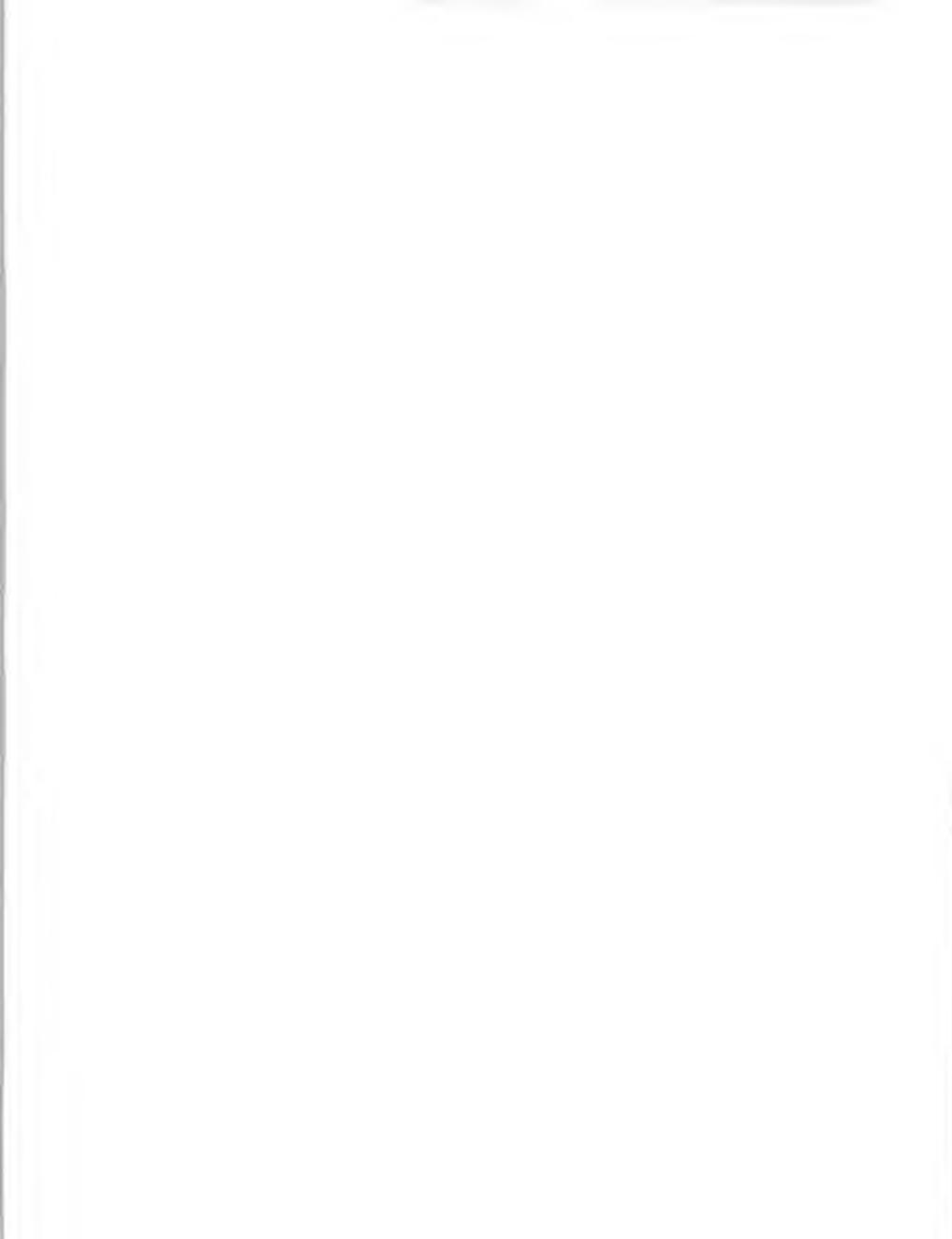
Advance of Technology versus Planning Focus



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1995 INPUT





Question

What thresholds are crossed with technology improvement?

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INPUT

Technology Forecasts

- Printing 100 MIPS computer this decade
- Using 100 MIPS computers in hand-held devices
- Megabit transmission rates common and affordable

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INPUT

